

Technical Attachment**Quality Control of Upper Air Observations at NCEP**

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*(Ed. note: The attention of forecasters was recently drawn to procedures used at NCEP to quality control upper air observations prior to model runs. The Senior Duty Meteorologist (SDM) has had the responsibility of providing manual QC when necessary, but studies have indicated automated procedures have reached a point where that may no longer be necessary. Responding to questions from forecasters on this subject, Geoff Dimego provided the following summary.)*

I would like to remind everyone that there is a considerable amount of quality control applied to data within all of NCEP's data processing and analysis systems. Much of this is described under authors Bill Collins and Dennis Keyser in the Research Papers section of EMC's Mesoscale Modeling Branch Web page at <http://www.emc.ncep.noaa.gov/mmb/>. The capability and sensitivity of our QC has grown steadily, especially in light of how dramatically our observations database has grown over the years.

Many forecasters may be unaware of just how much non-RAOB data goes into the NCEP analyses these days. While we still consider RAOB data to be one of our most accurate and complete data sources, overall the RAOB data do NOT dominate our analyses anymore. The vast diversity of our observation database can be seen from the information in Suru Saha's displays of "GFS SSI data distributions" and "GFS SSI data dump counts" viewable from the Verification and Diagnostics section of the Global Climate and Weather Modeling Branch web page at <http://www.emc.ncep.noaa.gov/gmb/>.

What about manual interaction in quality controlling when and how RAOB data are used? Historically, the Senior Duty Meteorologist had played a role in this. NCEP has conducted impact tests where the subjective (i.e., human) quality control decisions were disabled and the Global Data Assimilation System and Global Forecasts System runs were made and then compared with the operational runs which had the human quality decisions. We found no impact. The experiments were made with the global system because relatively few decisions are made in the brief time between receipt of RAOB data and the start of the Eta runs and, therefore, most of the subjective decisions are made outside of North America and in time for the GFS (what used to be known as AVN) runs. These results show clearly that the vast majority of bad data identified and flagged by the human was also rejected by the *objective* quality control steps within the global analysis. These results lead us to consider modifying the practice of continuing manual quality control decisions.

This is not to say that a human won't be monitoring the data flow and the quality of data AND the performance of the quality control. No consideration is being given to discontinuing the use of reject lists of consistently bad stations (which are and would continue to be maintained by a human). We do envision a much stronger synergy between the developers of the objective quality control algorithms in EMC and the monitors who would provide periodic feedback on their perceptions of where and when the algorithms work poorly and need refinement. I do want to stress that there have been no final decisions made yet.